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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/054,957
Filing Date: January 25, 2002
Appellant(s): HOUSTON ET AL.

Theodore W. Houston
Amitava Chatterjee
For Appellant

MAILED
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EXAMINER'S ANSWER

This is in response to the appeal brief filed 02 December 2005 appealing from the Office action mailed 14 July 2005

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

The copy of the appealed claims contained in the Appendix to the brief is correct.

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 10 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Jones et al. (US 4,212,683).

The Jones et al. patent (Jones) discloses a transistor (see figs. 1-6, 14 and accompanying text). The transistor comprises: a semiconductor substrate 11 having first and second spaced apart source/drain regions 12, 13 therein (see Figs. 2, 14 and col. 4, lines 34-37); and a channel region between the source/drain regions in the substrate, the channel region having a relatively low V_T central region, enhancement channel region 27, between the source/drain regions 12 and 13 and relatively high controlling V_T regions, depletion channel regions 28 and 29, adjacent to the source/drain regions (see Fig. 6; col. 4, lines 62-64; col. 5, lines 28-37; and col. 6, lines 3- 11),[1,2,3] the channel region having an implanted negative V_T dopant in the enhancement channel region 27 intermediate the source/drain regions (fig. 6 and col. 4, lines

[1] The enhancement channel region 27 has a V_T of -0.5 V, whereas the depletion channel regions 28, 29 have a V_T of +3.5 V (see col. 6, lines 7-10).
[2] The depletion channel regions 28, 29 are controlling V_T regions (see col. 7, lines 10-16).
[3] The source/drain regions 12, 13 shown in Figs. 2 and 14 are not shown in Figs. 2-6. However, since Fig. 2 shows the initial structure in the sequence of steps shown in Figs. 2-6 and 14, and Fig. 14 shows the final structure in the sequence, it is inherent that the source/drain regions are there.

62-68)[4] and having an implanted positive V_T dopant in the depletion channel regions 28, 29 adjacent the source/drain regions 12, 13 (fig. 6 and col. 5, lines 28-37);[5,6] where the controlling V_T is defined as that region which is the least conducting region.[7]

The first source/drain region 12 is a source region and the second source/drain region 13 is a drain region (col. 4, lines 34-37).

(10) Response to Argument

Applicants argue that the alleged relatively low V_T region 27 of the Jones et al. reference extends from source to drain and, thus fails to conform to the structure as claimed.

The structure shown in Figure 6 of the Jones et al. reference clearly shows that the enhancement channel region 27 does not extend from the source to drain. The depletion channel regions 28, 29 are formed on either side of the enhancement channel region 27, thus preventing it from extending from the source to drain.

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[4] Phosphorus ions which are negative or n-type dopants are implanted through a mask to form the enhancement channel region 27 in the channel region and between the source/drain regions 12, 13 (see Fig. 3 and col. 5, lines 60-65).

[5] Boron ions which are positive or p-type dopants are implanted through a mask to form the depletion channel regions 28, 29 in the channel region and adjacent the source/drain regions 12, 13 (see Fig. 3 and col. 5, lines 60-65).

[6] The V_T dopant in enhancement channel region 27, which is located in the channel region intermediate the source/drain regions, is negative or n-type. The V_T dopant in the depletion channel regions 28, 29, which are located in the channel region adjacent the source/drain regions 12, 13 is positive or p-type. Therefore, the V_T dopant adjacent the source/drain regions has a dopant conductivity type that is opposite the dopant conductivity type in the intermediate region.

[7] The controlling V_T regions, depletion channel regions 28, 29, are least conducting. This is true because the depletion regions have a dopant concentration ($4x10^{17}/cm^3$), which is less

Applicants argue that a central region intermediate the controlling regions is not found in Jones et al.

The depletion channel regions 28, 29 are controlling V_T regions (see Jones et al. - col. 7, lines 10-16). The enhancement channel region 27 is intermediate the depletion channel regions 28, 29 (see Jones et al. - Fig. 6).

Applicants argue that claim 10 requires a channel region between source/drain regions in the substrate having a relatively low V_T central region between the source/drain regions and relatively high controlling V_T regions adjacent to source/drain regions.

Phosphorus ions are implanted through a mask to form the enhancement channel region 27 in a central region of the channel region and between the source/drain regions 12, 13 (see Fig. 3 and col. 5, lines 60-65). Likewise, Boron ions are implanted through a mask to form the depletion channel regions 28, 29 in the channel region and adjacent the source/drain regions 12, 13, such that the depletion channel regions are on either side of the enhancement channel region (see Fig. 3 and col. 5, lines 60-65). The enhancement channel region 27 has a relatively low V_T of -0.5 V, whereas the depletion channel regions 28, 29 have a relatively high V_T of +3.5 V (see col. 6, lines 7-10). The depletion channel regions 28, 29 are controlling V_T regions (see col. 7, lines 10-16).

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than the dopant concentration of the enhancement channel region ($5x10^{17}/cm^3$). See col. 5, lines 62-65 and col. 6, lines 5-7).

Applicants argue that nothing in Jones et al. defines the regions 28, 29 as that region which is the least conducting and, thus controls the current flow.

As stated previously, the depletion channel regions 28, 29 are controlling V_T regions (see col. 7, lines 10-16). The controlling V_T regions 28, 29 are also least conducting. This is true because the depletion regions have a dopant concentration ($4x10^{17}/cm^3$), which is less than the dopant concentration of the enhancement channel region ($5x10^{17}/cm^3$). For the dopant concentration of the enhancement channel region 27, see col. 5, lines 62-65. For the dopant concentration of the depletion channel regions 28, 29, see col. 6, lines 5-7.

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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21 Feb. 2006